

CLAIMS:

1. An information signal recording method comprising the steps of:

recording a burst-like digital information signal including a plurality of first data-head indicative information arranged at a predetermined period, each of said first information including a synchronizing signal, address, control signal and error detecting signal, and a clock regenerating signal for regenerating clocks for said digital information signal on separate areas of a magnetic recording medium by a cylinder head;

generating a plurality of second data-head inductive information of the same structure as said first data-head indicative information; and

applying said second data-head indicative information at a predetermined period to said clock regenerating signal so as to be synchronized with said first data-head indicative information.

2. A method according to claim 1, wherein said digital information signal includes a plurality of data blocks each including one of said first data-head indicative information and main information, said plurality of data blocks forming a data frame, and wherein said second data-head indicative information are inserted at a period equal to a length of each of said data blocks in said clock regenerating signal.

3. A method according to claim 2, wherein values

of the addresses of said second data-head information in said clock regenerating signal are recorded in a manner that a value of the address in the first data-head indicative information of first one of said data blocks is predictable in accordance with a predetermined rule.

4. A method according to claim 3, wherein the values of the addresses of said second data-head indicative information in said clock regenerating signal are designated as $n-k$, $n-(k-1)$, $n-(k-2)$, ---, $n-1$, with n representing the value of the address of the first data-head indicative information of the first data block of said digital information signal, and k representing the number of said second data-head indicative information in said clock regenerating signal.

5. A method according to claim 3, wherein the values of the addresses of said second data-head indicative information in said clock regenerating signal are set to values which are not assigned to the addresses of said first data-head indicative information in said digital information signal.

6. A method according to claim 3, wherein the values of the addresses of said second data-head indicative information in said clock regenerating signal are selected in a manner that the rearward addresses in said data frame are designated as $n+m-k$, $n+m-(k-1)$, $n+m-(k-2)$, ---, $n+m-1$, with n representing the value

of the address of the first data-head indicative information of said first data block in said digital information signal, m representing the number of said data blocks in said data frame, and k representing the number of said second data-head indicative information in said clock regenerating signal.

7. An information signal recording apparatus for respectively recording a burst-like digital information signal including a plurality of first data-head indicative headers arranged at a predetermined period, each of said headers including a synchronizing signal, address, control signal and error detecting signal for data, a clock regenerating signal for regenerating clocks for said digital information signal on separate areas of a magnetic recording medium by a cylinder head, said apparatus comprising:

signal processing means for interleaving an input data and generating and adding error detecting codes to said input data;

data generating means for generating data which has a waveform advantageous for clock regeneration when modulated by the same modulation system as used during the recording of said digital information signal;

first selector means for selecting an output from said data generating means during an interval of said clock regenerating signal and selecting an output from said signal processing circuit during an interval

of said digital information signal;

header generating means for generating
25 addresses enabling prediction of a time of occurrence
of first one of said first data-head indicative
information during the interval of said clock regenerat-
ing signal where a plurality of second data-head
indicative headers of the same structure as said first
30 data-head indicative headers are generated and for
generating addresses of a time sequential order during
the interval of said digital information signal;

second selector means for effecting switching
between the outputs of said header generating circuit
35 and said first selector means during the interval of
said clock regenerating signal and the interval of
said digital information signal, respectively;

modulating means for modulating the output
of said second selector means; and

40 recording means for recording the modulated
signal from said modulating means.

8. An information signal playback method for
detecting a magnetic record pattern including a clock
regenerating signal and a digital information signal
which are respectively recorded on separate areas of
5 a magnetic tape by a cylinder head and regenerating
clocks in accordance with said detected clock regenerat-
ing signal thereby reproducing said digital information
signal, said method comprising the steps of:

detecting data synchronizing signals starting

from an interval of said clock regenerating signal to determine the normality of each said detected synchronizing signal to protect an existing synchronous state when the same is determined accurate;

15 detecting addresses starting from the interval of said clock generating signal to determine the normality of each said detected address and protect the same when the same is determined accurate to predict a time of occurrence of first data-head indicative information including a data synchronizing signal, address, control 20 signal and error detecting signal for first one of a plurality of data blocks of said digital information signal; and

discriminating said clock regenerating signal and said digital information signal from each other in response to the detection of said accurate address.

9. An information signal playback apparatus for detecting a magnetic record pattern including a clock regenerating signal and a digital information signal which are respectively recorded on separate areas on a magnetic tape by a cylinder head and regenerating clocks in accordance with said detected clock regenerating signal thereby reproducing said digital information signal, said apparatus comprising:

10 synchronizing signal detecting means for detecting data synchronizing signals during an interval of said clock regenerating signal;

synchronization discriminating means for

determining whether each said synchronizing signal
detected by said synchronizing signal detecting means is
15 accurate;

synchronous counter means adapted to be
initialized by each said synchronizing signal determined
accurate by said synchronization discriminating means
to repeat counting at a synchronizing signal reproduc-
20 tion period to maintain an accurate synchronous state;

demodulating means for demodulating data;

address detecting means for detecting addresses
of said data during the interval of said clock
regenerating signal;

25 address discriminating means for determining
whether each said address detected by said address
detecting means is accurate;

address protecting means whereby each said
address determined accurate by said address discriminat-
30 ing means is maintained, and an accurate address is
generated from a previously maintained address when
each said address is determined as being in error by
said address discriminating means;

clock regenerating signal discriminating means
35 for discriminating said clock regenerating signal and
said digital information signal in response to the
detection of each said accurate address;

clock regenerating signal eliminating means
responsive to said clock regenerating signal discriminat-
40 ing means to delete said clock regenerating signal; and

signal processing means for performing error correcting processing and data interleaving of said digital information signal.

10. An information signal recording and playback method for respectively recording a burst-like digital information signal including a plurality of first data-head indicative information arranged at a pre-determined period, each of said first information including a synchronizing signal, address, control signal and error detecting signal, and a clock regenerating signal for regenerating clocks for said digital information signal on separate areas of a magnetic recording medium by a cylinder head and for detecting said recorded magnetic record pattern by said cylinder head and regenerating said clocks in accordance with said detected clock regenerating signal thereby reproducing said digital information signal, said method comprising the steps of:

forming in said clock regenerating signal a plurality of second data-head indicative information of the same structure as said first data-head indicative information, said digital information signal including a data frame including a plurality of data blocks each thereof being formed by one of said first information and main information;

applying said second data-head indicative information at a predetermined period equal to the length of each of said data blocks to said clock

regenerating signal so as to be synchronized with said first data-head indicative information;

30 recording values of the addresses of said second data-head indicative information in said clock regenerating signal in such a manner that a value of the address of said first data-head indicative information in first one of said data blocks is predictable in accordance with a predetermined rule;

25 detecting during reproduction said data synchronizing signals starting from an interval of said clock regenerating signal to discriminate the normality of each said detected synchronizing signal and thereby to protect an existing synchronous state when the same is determined to be accurate;

40 detecting said addresses starting from the interval of said clock regenerating signal to discriminate the normality of each said detected address whereby when each said detected address is determined accurate, said address is protected to predict a time of occurrence of first one of said first data-head indicative information of said digital information signal; and

discriminating said clock regeneratring signal and said digital information signal from each other in response to the detection of said accurate address.

11. A method according to claim 10, wherein values of the addresses of said second data-head indicative information in said clock regenerating signal are

designated as $n-k$, $n-(k-1)$, $n-(k-2)$, ---, $n-1$,
5 with n representing the value of the address of said
first data-head indicative information of first
one of said data blocks in said clock regenerating
signal, and k representing the number of said second
data-head indicative information in said clock regene-
10 rating signal.

12. A method according to claim 10, wherein the
values of the addresses of said second data-head
indicative information in said clock regenerating signal
are set to values which are not assigned to the addresses
5 of said first data-head indicative information in said
digital information signal.

13. An information signal recording and playback
apparatus for respectively recording a burst-like
digital information signal including a plurality of
first data-head indicative headers arranged at a pre-
5 determined period, each of said first headers including
a synchronizing signal, address, control signal and
error detecting signal for data, and a clock regenerating
signal for regenerating clocks for said digital infor-
mation signal on separate areas of a magnetic recording
10 medium by a cylinder head and for detecting said
recorded magnetic record pattern by said cylinder head
to regenerate said clocks in accordance with said
detected clock regenerating signal thereby reproducing
said digital information signal, said apparatus
15 comprising:

signal processing means for interleaving an input data and generating and adding error detecting codes to said input data,

data generating means for generating data which results in a waveform advantageous for clock regeneration when the same is modulated by the same modulation system as used during recording of said digital information signal;

first selector means for selecting an output of said data generating circuit during an interval of said clock regenerating circuit and selecting an output from said signal processing means during an interval of said digital information signal;

header generating means for generating addresses enabling prediction of a time of occurrence of first one of said first data-head indicative headers during the interval of said clock regenerating signal where a plurality of second data-head indicative information of the same structure as said first data-head indicative information are generated and for generating addresses of a time sequential order during the interval of said digital information signal;

second selector means for effecting switching between the output of the header generating means and the output of said first selector means at a predetermined period during the interval of said clock regenerating signal and the interval of said digital information signal, respectively;

modulating means for modulating the output of
said second selector means;

recording means for recording the signal
modulated by said modulating means;

synchronizing signal detecting means for
detecting said data synchronizing signals starting from
the interval of said clock regenerating signal;

synchronization discriminating means to
determine whether each said detected synchronizing
signal is accurate;

synchronous counter means adapted to be
initialized by said synchronized signal determined
accurate by said synchronization discriminating means
to repeat counting at a synchronizing signal reproducing
period to maintain an accurate synchronous state;

demodulating means for demodulating said
data;

address detecting means for detecting the
addresses of said data starting from the interval of
said clock regenerating signal;

address discriminating means for determining
whether each said address detected by said address
detecting means is accurate;

address protecting means for maintaining each
said address determined accurate by said address
discriminating means and for generating an accurate
address from a previously maintained address when said
address discriminating means determines that each said

detected address is being in error;

clock regenerating signal discriminating means for discriminating said clock regenerating signal and said digital information signal from each other in response to the detection of said accurate address;

clock regenerating signal eliminating means responsive to said clock regenerating signal discriminating means to delete said clock regenerating signal; and

signal processing means for performing error correcting process and data interleaving on said digital information signal.

14. An information signal recording method comprising the steps of:

recording a burst-like digital information signal including a plurality of data blocks each including first data-head indicative information and main information, each of said first information including at least a synchronizing signal and address for data, and a clock regenerating signal for regenerating clocks for said digital information signal on separate areas of a recording medium by a cylinder head;

forming a plurality of second data-head indicative information each including at least synchronizing signal identifying code; and

inserting said plurality of second data-head indicative information at a period equal to the length of each of said data blocks in said clock regenerating signal.

15. An information signal recording method comprising the steps of:

recording respectively a burst-like digital information signal including a plurality of data blocks each including first data-head indicative information and main information, each of said first information including a synchronizing signal and address, a carrier regenerating signal for carrier regeneration serving as a signal for regenerating said digital information signal, and a clock regenerating signal for regenerating clocks on separate areas of a magnetic recording medium by a cylinder head;

generating a plurality of second data-head indicative information of the same structure as said first data-head indicative information; and

inserting said second data-head indicative information at a period equal to the length of each of said data blocks in said carrier regenerating signal and said clock regenerating signal.